DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N762445874

FACILITY: VECTOR PIPELINE L.P. Washington Compressor Station		SRN / ID: N7624
LOCATION: 12708 30 MILE RD, WASHINGTON		DISTRICT: Southeast Michigan
CITY: WASHINGTON		COUNTY: MACOMB
CONTACT: Zach Szeplakay , Mechanical Technician		ACTIVITY DATE: 08/31/2018
STAFF: Sebastian Kallumkal	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Onsite Inspection		
RESOLVED COMPLAINTS:		

On Friday, August 31, 2018, I, Sebastian Kallumkal, Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD) staff conducted a targeted annual inspection at the Vector Pipeline L.P.-Washington Compressor Station located 12708 30 Mile Road, Romeo, Michigan. The purpose of the inspection was to verify facility's compliance with requirements of Article II, Air Pollution Control, Part 55 of Act 451 of 1994, and the requirements of the Renewable Operating Permit No.: MI-ROP-N7624-2014.

Vector Pipeline Compressor Station is involved in the transportation of natural gas in the pipeline system from Joliet, Illinois to Dawn Township, Ontario, Canada. This facility is operated 24 hours and all year around. It operates two Solar Turbines Incorporated (Solar) Mars 100S natural gas fired turbines. Each turbine is rated at 15,000 Horse Power with a maximum heat input rate of 120 MMBTU/hr. These turbines are designed with nitrogen oxides (NOx) emission control referred to as dry low NOx (DLN) or SoLoNOx. Each turbine drives a SOLAR C65 compressor. The facility also has one natural gas-fired internal combustion engine, 9.654 MMBTU/hr, emergency generator. The turbine operations can also be remotely controlled by from office in Houston, Texas.

The facility is a true minor source for HAP emissions and hence not subject to the National Emission Standard for Hazardous Air Pollutant (NESHAP) for turbines. The ROP has PSD-Opt Out limit for CO emissions. Facility started operations in November 2007. It conducted emission tests to verify NOx and CO emissions from the SOLAR turbines on January 15 and 16, 2008 (See MACES Report No. CA N762401213). Other annual NOx emission tests were conducted on March 4, 2010, April 1, 2011, May 9, 2012, July 16, 2013, July 28, 2015 and September 14, 2017. Both turbines were tested at 93% and 103% NGP.

Turbine maintenance includes quarterly washing, emergency shut down testing, and quarterly, semi-annual and annual maintenance. At this facility the natural gas from the turbine testing and from the annual full station ESD testing is not vented to the atmosphere. The facility has the ability to "lock in" the station using a valve and thus prevent the gas from being discharged. Emergency shut down and natural gas venting need to be reported to the Michigan Public Service Commission and to AQD under Rule 285(mm) if it meets the criteria.

On August 28, 2018, I visited the facility to conduct an inspection, but at the gate I was told by a Vector Employee (Mike Betzold) that facility was undergoing its annual Emergency Shut Down (ESD) and the facility personnel would be busy with that process. So, I left the facility without conducting the inspection.

On August 31, 2018, I arrived at the facility about 11:00 AM. I met Mr. Zach Szeplakay, Mechanical Technician, Enbridge (U.S.), Inc. Mr. Chad Desero, Instrument & Operations Technician. Enbridge (U.S.), Inc. later joined the inspection. I introduced myself and stated the purpose of the visit. Zach told me that Unit 100 (EUTURBINE1) and Unit 200 (EUTURBINE2) are currently running. He told me that the turbines are more often compared to previous years because natural gas connection from NEXUS line.

Next, we discussed the conditions of the permit. He provided me the records that the facility regarding emergency engine maintenance, oil change, turbine maintenance, natural gas analysis, sulfur content analysis, etc. to verify compliance with the ROP requirements. I reviewed various records including Turbine operating data (natural gas producer speed), start/shut down, emission reports, etc. for 2016 to verify that the facility is keeping appropriate operating data and emissions data as required. Currently the facility is keeping these records electronically. The facility later emailed me the operations and emissions data for Sep-Dec. 2016, all year 2017 and Jan-July 2018. Currently the facility is keeping records as identified below.

After the records review, I took the operating data for both turbines which were operating at that time. I did not inspect the turbines in the turbine room because the operation data was available from the control room. I inspected the emergency engine. It was not operating at that time. When I left the control room, the turbines were still operating which was evident from the heat waves at the stacks. I did not observe any visible emissions from the stacks.

Table: Table Name & Content

1. Turbine 1 Hourly Emission Data - Year, Date/Time, Hourly (%NGP, HP, Solonox Mode [on/off], CO and NOx emissions)
2. Turbine 2 Hourly Emission Data - Year, Date/Time, Hourly (%NGP, HP, Solonox Mode [on/off], CO and NOx emissions)
3. Turbine Daily Operating Hours and Fuel Consumption (For both turbines separately-daily operating hours, number of starts, and natural gas fuel usage)
4. Turbine Monthly Operating Hours and Fuel Consumption (For both turbine separately-monthly operating hours and monthly natural gas usage)
5. No Table identified
6. Turbine No.1 Monthly Emission Data (Monthly operating hours, monthly and 12-month rolling CO, NOx, & SO2 emissions)
7. Turbine No.2 Monthly Emission Data (Monthly operating hours, monthly and 12-month rolling CO, NOx, & SO2 emissions)
8. SPU (Emergency Generator) Daily Operating Hours and Fuel Consumption
9. SPU Monthly Emission Data (monthly operating hours, monthly & 12 month rolling natural gas usage, CO emissions, NOx emissions and SO2 emissions)
10. Source-Wide 12-Month Rolling Total Emissions (Monthly and 12-monthly rolling facility-wide CO, NOx and SO2 emissions)

Inspection:

MI-ROP-N7624-2014

SOURCE-WIDE Conditions includes requirements for Rule 285(mm) to notify AQD in case of natural gas venting (emergency or routine) of more than 1 Million cubic feet. On September 19, 2016, the facility notified that due to annual emergency shut down, 1 MMCF of natural gas may be released on September 22, 2016. The facility currently has the ability to "lock in" the station and prevent gas from being discharged. According to the facility personnel, when the 2018 ESD testing at Washington occurred, it was completed without venting any gas.

EUSPU3

The facility has a natural gas fired internal combustion engine emergency power unit rated at 8.43 MMBTU/hr. At the time of my inspection, this emergency generator was not operating. The facility is keeping records of the hours of operation and fuel usage on a daily basis. The hours of operation are limited to 500 hours per year. The records show that facility operated 0.2 hours in 2017 and 0.6 hours in Jan-July 2018. The facility is only burning natural gas in this

emergency generator. The facility also keeps records of daily and monthly fuel usage (Table 8 and Table 9) and NOx and CO emissions on a monthly basis. The stack dimensions appear to be in compliance with the ROP requirements.

I collected the emergency engine maintenance records (oil analysis and oil change) for 2017 and 2018 and maintenance log.

Under quality of gas in the Tariff kept at the facility, the sulfur content is limited to 20 grains per 100 cubic feet (1/4 grain H2S per 100 cubic feet of gas) which is in compliance with 40 CFR Part 72.2. The sulfur content, N2 content and other gas quality information are posted on the company's website (www.vectorpipeline.com/informational postings/gas quality/gas quality information.) This site also has the Tariff information. The company monitors the gas quality continuously along many sites on the pipeline, but the web site shows analyses from two sites (Springwell and Belle River). The results show that the sulfur content is less than 20 grains sulfur per 100 cubic feet (CCF) of natural gas.

This emergency generator installed after June 12, 2006 and located at an area source of Hazardous Air Pollutant (HAP) emissions is subject to 40 CFR 63, Subpart ZZZZ- NESHAP for Stationary Reciprocating Internal Combustion Engines (Area Source MACT). 40 CFR 63.6590 (c)(1) requires that spark ignition stationary reciprocating internal combustion engines must meet the requirements of 40 CFR 63, Subpart ZZZZ by meeting the requirements of 40 CFR Part 60, Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. This emergency generator was installed in February 2007. Subpart JJJJ is applicable to emergency engines with a maximum engine power greater than 19 KW (25 HP) manufactured on and after January 1, 2009 per [40 CFR 60.4230(a)(4)(iv)].

FGTURBINES

The facility has two SOLAR Turbine Incorporated MARS 100S natural gas fired turbines (EUTURBINE1 and EUTURBINE2) rated each at 15,000 HP and 120 MMBTU/hr. These turbines are equipped with dry low NOx emission controls (SOLONOx). The NOx emissions are limited to 25 ppm at 15% oxygen (O2) and sulfur dioxide emissions are limited to 0.06 lb per MMBTU per 40 CFR 60, Subpart KKKK. Compliance with sulfur dioxide emissions are based on the sulfur content of the natural gas. The Carbon monoxide emissions are limited to 800 pounds per hour while the natural gas producer speed (NGP) is between 87 to 92% and 18.8 pounds per hour while operating above 92%. The hourly and annual NOx and CO emissions are calculated based on the emission factors generated during emission tests and the average hourly NGP. Both turbines were operating at the time of the inspection.

The turbines at this facility are subject to NSPS Subpart KKKK which requires annual testing for NOx emissions unless the NOx emissions are less than 75% of the limit (25 PPM at 100% load). If the emissions are less than 75% of the limit, the testing is only required once in two years. ROP requires verification of CO emission rates and develop emission factor for CO once in every 5 years.

At the facility I reviewed a few of the 2016 operations records and later 2017 and 2018 (Jan-July) records in the office. Based on the records facility did not appear to have operated the turbines below 92% NGP except for times during startup and shutdown. The CO and NOx emissions tests were conducted on September 14, 2017 for both turbines. The report (received November 8, 2017) showed that the both pollutant emissions were in compliance with the permit limits. The facility is continuously monitoring the "SOLONOx" ON/OFF mode.

The facility verifies NOx emissions and Oxygen emissions from each turbine in accordance with 40 CFR Parts 60.8, 60.4400 and 60.4340(a). The facility has completed the initial NOx and CO emission verifications on January 2008. The September 14, 2017 test showed that the NOx

emissions from both turbines were below 75% of the limit at 93% NGP and 103% NGP. So, NOx emission test need not to be repeated for another two years, pursuant to Section V, Condition 1.

From the September 14, 2017 Test Report:

% NGP	TURBINE	Pollutant	Avg. ER	Emission Limit
93	EUTURBINE1	NOx	4.6 ppmv	25 ppmv
		CO	0.3 lb/hr	9.4 lb/hr
93	EUTURBINE2	NOx	9.2 ppmv	25 ppmv
		CO	0.3 lb/hr	9.4 lb/hr
103	EUTURBINE1	NOx	6.4 ppmv	25 ppmv
		CO	0.4 lb/hr	9.4 lb/hr
103	EUTURBINE2	NOx	10.6 ppmv	25 ppmv
		CO	0.4 lb/hr	9.4 lb/hr

The facility is keeping hourly records of hourly %NGP, SOLONOx ON/OFF and NOx and CO emissions for each turbine, copy of the tariff, amount of natural gas combusted, number of startups and shut downs, and the operating hours for each turbine on hourly basis. Each turbine control monitor has indicator for SOLONOX ON/OFF mode while in operation. The SOLONOX MODE ACTIVE sign is highlighted while the system runs on SOLONOX Mode. The facility also keeps records of annual CO and NOx emissions based on a monthly basis. The facility keeps a copy of the tariff. Facility also keeps records for the maintenance performed on the turbines. The stack dimensions appear to be in compliance with the permit requirements.

Under quality of gas in the Tariff kept at the facility, the sulfur content is limited to 20 grains per 100 cubic feet (1/4 grain H2S per 100 cubic feet of gas) which is in compliance with 40 CFR Part 72.2. The sulfur content, N2 content and other gas quality information are posted on the company's website (www.vectorpipeline.com/informational postings/gas quality/gas quality information.) This site also has the Tariff information. The company monitors the gas quality continuously along many sites on the pipeline, but the web site shows analyses from two sites (Springwell and Belle River). The results show that the sulfur content is less than 20 grains sulfur per 100 cubic feet (CCF) of natural gas. I also collected sample maintenance records for Units 100 and 200, H_2S analysis (main line), etc. The proved Belle River GC analysis report shows that the H_2S content was 0.0045 grains/CCF (0.07 PPM). The facility has an onsite GC in the compressor room for the natural content analysis.

He provided me copies of the Preventive Maintenance Plan, quarterly, semi-annual and annual maintenance. He informed me that they didn't have a turbine engine change recently. They also submitted 2016, 2017 and 2018 (Jan-July) operations and emissions data via email.

FGFACILITY

The facility-wide Carbon Monoxide (CO) and Oxides of Nitrogen (NOx) are limited to 219.18 tons and 81.34 tons per year based on a rolling 12-month time period. The calculated 12 month rolling NOx, CO and SO_2 emission rates as of July 2018 were 8.69 TPY, 2.10 TPY and 0.89 TPY respectively.

Conclusion: From the facility inspection, records and reports review, this facility appears to be in compliance with the applicable requirements. Above mentioned records and sample copies of 2018 Records are attached for review.

NAME Sebastian Kallumkal DATE 9/20/2018 SUPERVISOR Jaye B